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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

THOMAS A. GENISE

Application No: 08/666,164 Group Art Unit: 3502

Filed: June 19, 1996 Examiner: T. Kwon

For: AUTOMATED TRANSMISSION SYSTEM CONTROL WITH ZERO ENGINE FLYWHEEL TORQUE DETERMINATION

ADDENDUM TO FIRST, SECOND, THIRD AND FOURTH REQUESTS FOR INTERFERENCES PURSUANT TO 37 C.F.R. §§ 1.607 AND 1.608

Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

I. INTRODUCTION

On August 29, 1997, Applicant filed First, Second, Third and Fourth Requests For Interferences in connection with U.S. Patent Nos. 5,573,477 5,571,059, 5,569,115 and 5,573,558, respectively. Applicant also filed, on August 29, 1997, a Petition To Correct Inventorship under 37 CFR § 1.48, a Consent of the Assignee To Correction of Inventorship, a Verified Statement of Original Named Inventor, and an Amendment To Correct Inventorship. In the Amendment To Correct Inventorship, Applicant added the names of Ronald K. Markyvech and James R. McReynolds as co-inventors to the subject application. Messrs. Markyvech and McReynolds, along with the original named inventor, Thomas A. Genise, are inventors of at least one of the claims pending in the subject application.

Applicant herein identifies the inventor(s) of each of the proposed counts set forth in the First, Second, Third and Fourth Requests For Interferences. In identifying the inventor(s) of the various proposed counts, Applicant will refer to the Exhibits and Affidavits filed with the Requests For Interferences on August 29, 1997.

II. FIRST REQUEST FOR INTERFERENCE OF U.S. PATENT NO. 5,573,477

In the First Request For Interference, Applicant requested that the Examiner declare an interference between U.S. Patent No. 5,573,477 and the subject application.

A. The Proposed Counts

In the First Request For Interference, Applicant proposed the following Counts 1 and 2 for the interference.

COUNT 1

> A vehicle drive comprising:
>
> an engine having an output shaft;
>
> a transmission selectively connected to said engine output shaft, said transmission having several selectively actuated speed ratios, said transmission having a transmission output shaft, said selected speed ratios controlling the ratio of the input speed from said engine output shaft to the output speed of said transmission output shaft; and
>
> an engine control to control a parameter of said engine, said engine control including an operator input to allow an operator to signal a desire to eliminate torque between said engine output shaft and said transmission output shaft, said operator signal requesting said engine control to determine a zero torque parameter value for said engine output shaft that approximates a zero torque load on the connection between said engine and said transmission, and said engine control being

operable to control said engine to achieve said zero torque parameter value.

COUNT 2

A method of operating a vehicle drive comprising the steps of:

a. providing an engine, an engine parameter control, a multi-speed transmission driven by an output shaft of said engine, said transmission being provided with several selectively actuated speed ratios, a manual stick shift for changing speed ratios in said transmission;

b. predicting a zero torque parameter value for said engine based on system variables;

c. modifying said engine parameter by said engine control to achieve said zero torque value; and

d. manually moving said transmission out of engagement to a neutral position.

Count 1 defines a vehicle drive, and Count 2 defines a method of operating a vehicle drive. The proposed Count 1 corresponds exactly to claim 1 of U.S. Patent No. 5,573,477 and to claim 25 of the subject application. The proposed Count 2 correspond exactly to claim 17 of U.S. Patent No. 5,573,477 and to claim 43 of the subject application.

B. <u>James R. McReynolds is the Inventor of Proposed Counts 1 and 2 of the First Request for Interference</u>

As set forth below, James R. McReynolds is the inventor of the subject matter defined in proposed Counts 1 and 2 of the First Request For Interference.

In early 1993, McReynolds conceived of a partially-automated transmission system which would be easier to drive than a manual

transmission system, but which would be considerably less expensive than a fully automatic transmission system which does not contain a shift lever. (McReynolds Affd. ¶4). In conceiving the transmission system McReynolds realized that considerable expense is associated with eliminating the shift lever of a transmission system. McReynolds conceived of a partially automated transmission system which maintains the shift lever - thereby reducing the cost of the system - but which allows the driver to shift gears without disengaging the master clutch and without manipulating the throttle pedal. (McReynolds Affd. ¶4-5). On August 11, 1993, McReynolds faxed a specification-type document (Exhibit A) to Eaton's patent counsel, Howard D. Gordon. Also in August 1993, McReynolds called Tom Genise to discuss the possibility of Genise developing the partially automated transmission system which McReynolds named "AutoStick". (McReynolds Affd. ¶7). Specifically, McReynolds explained to Genise that the "AutoStick" transmission would include a shift lever, a shift button which the driver would depress in order to shift the transmission. In response to depressing the button, the system would automatically control engine fueling to minimize torque, thereby allowing the driver to move the shift lever to neutral without using the clutch pedal, and thereafter the system would automatically control engine fueling to approach the synchronization speed for the next gear and the driver can move the shift lever to the next gear without manipulating the throttle. (McReynolds Affd. ¶8-9). On September 7, 1993, McReynolds faxed

the specification-type document (Exhibit A) to Genise. (Genise Affd. ¶8).

C. Comparison of the Proposed Counts and the Contributions of James R. McReynolds

The proposed Counts 1 and 2 of the First Request For Interference define a vehicle drive including a multi-speed transmission which can be shifted with a manual stick shift. The vehicle drive includes an operator input for requesting torque elimination between the engine and the transmission. In response to this operator input, a zero torque condition is provided between the engine and the transmission so that the operator can manually move the transmission out of gear and into the neutral position.

The subject matter defined in Counts 1 and 2 of the First Request For Interference are described in McReynolds' Specification document - Exhibit A. Exhibit A describes a partially automated transmission system which includes an engine control to control a parameter of the engine (engine fuel). The engine control includes an operator input (operator switch) to allow an operator to signal a desire to eliminate torque between the engine output shaft and the transmission output shift by requesting the engine control to determine a zero torque parameter for the engine. Exhibit A describes an operator switch that when depressed causes the engine fueling to be controlled so as to minimize torque between the engine and the transmission (zero torque value) thereby allowing the operator to shift out of gear and into neutral.

In view of Exhibit A, and the Affidavits of McReynolds and Genise, James R. McReynolds is the inventor of the subject matter

defined in proposed Counts 1 and 2 of the First Request For Interference.

III. SECOND REQUEST FOR INTERFERENCE OF U.S. PATENT NO. 5,571,059

In the Second Request For Interference filed August 29, 1997, Applicant requested that the Examiner declare an interference between U.S. No. 5,571,059 and the subject application.

A. The Proposed Counts

In the Second Request For Interference, Applicant proposed the following Counts 1 and 2:

COUNT 1

> A vehicle drive comprising:
>
> an engine having an output shaft and an electronic control unit for controlling the output speed of said engine output shaft;
>
> a multi-speed transmission, said multi-speed transmission being selectively connected to said engine output shaft and operable to convert drive from said engine output shaft through several speed ratios to an output speed on a transmission output shaft;
>
> a clutch that may be selectively actuated by an operator, said clutch positioned between said engine and said transmission; and
>
> an input control for an operator, said input control allowing an operator to provide an indication to said electronic control unit of whether an upshift or a downshift is to be initiated, and further providing the operator the ability to request torque elimination during this shift, said electronic control unit being operable to receive signals from

said input control, and determine a desired engine speed at the next gear ratio based upon said operator indication, and to control said engine to achieve said desired engine speed, and said electronic control unit further being operable to modify an engine parameter to achieve reduced torque transmission to said transmission to allow an operator to move said transmission to a neutral position when a signal requesting torque elimination is received from said input control.

OR

A vehicle drive comprising:

an engine having an output shaft and an electronic control unit for controlling the output speed of said engine output shaft;

a multi-speed transmission, said multi-speed transmission being selectively connected to said engine output shaft and operable to convert drive from said engine output shaft through several speed ratios to an output speed on a transmission output shaft;

a clutch that may be selectively actuated by an operator, said clutch positioned between said engine and said transmission; and

an input control for an operator, said input control allowing an operator to provide an indication to said electronic control unit that a particular shift is to be initiated, the input control providing the operator the ability to request torque elimination during this shift, said electronic control unit being operable to receive signals from said input control, and determine a desired engine speed at the next gear ratio based upon receiving said

operator indication, and to control said engine to achieve said desired engine speed, and said electronic control unit further being operable to modify an engine parameter to achieve reduced torque transmission to said transmission to allow an operator to move said transmission to a neutral position when a signal requesting torque elimination is received from said input control.

COUNT 2

A method of operating a vehicle comprising the steps of:

a. providing a vehicle drive including an engine having an output shaft, an electronic control unit for controlling the speed of said engine output shaft, a multi-speed transmission selectably driven by said engine output shaft, said multi-speed transmission being operable to be moved between several speed ratios to control the ratio between an output speed on an output shaft of said transmission and the speed of said engine output shaft, a clutch disposed between said engine output shaft and said transmission to allow a elimination of drive from said engine to said transmission, and an operator input switch system allowing an operator to provide an indication to said electronic control unit of when an upshift or a downshift is to be expected as the next shift, and further providing the operator the ability to request torque elimination and further providing the operator the ability to request torque elimination from said electronic control unit such that the transmission may be moved to neutral without actuating said clutch;

b. providing an indication to said electronic control unit of whether an upshift or a downshift is expected as the next gear shift;

c. identifying a desired engine speed at the next expected gear ratio based upon said driver input of whether an upshift or a downshift is next expected;

d. providing a torque elimination request from said operator switch;

e. controlling an engine parameter to reduce the torque load from said engine on said transmission;

f. manually moving said transmission to neutral;

g. using said electronic control unit to begin moving said engine output speed to said desired engine speed; and

h. engaging said transmission in said next selected gear.

OR

A method of operating a vehicle comprising the steps of:

a. providing a vehicle drive including an engine having an output shaft, an electronic control unit for controlling the speed of said engine output shaft, a multi-speed transmission selectably driven by said engine output shaft, said multi-speed transmission being operable to be moved between several speed ratios to control the ratio between an output speed on an output shaft of said transmission and the speed of said engine output shaft, a clutch disposed between said engine output shaft and said transmission to allow a elimination of drive from said engine to said transmission, and an operator input switch system allowing an operator to provide an indication to said electronic control unit that a particular shift is to be expected, the operator input switch system providing the

operator the ability to request torque elimination from said electronic control unit such that the transmission may be moved to neutral without actuating said clutch;

b. providing an indication to said electronic control unit of whether an upshift or a downshift is expected as the next gear shift;

c. identifying a desired engine speed at the next expected gear ratio based upon said driver input of whether an upshift or a downshift is next expected;

d. providing a torque elimination request from said operator switch;

e. controlling an engine parameter to reduce the torque load from said engine on said transmission;

f. manually moving said transmission to neutral;

g. using said electronic control unit to begin moving said engine output speed to said desired engine speed; and

h. engaging said transmission in said next selected gear.

Count 1 defines a vehicle drive, and Count 2 defines a method of operating a vehicle drive. Each of proposed Counts 1 and 2 is recited in the "OR" format. The proposed Count 1 corresponds exactly to Desautels et al '059 patent claim 1 and to Genise '164 application claim 79 - or to claim 141 of the present application. The proposed Count 2 corresponds exactly to Desautels et al '059 patent claim 9 and to Genise '164 application claim 83 - or to claim 142 of the present application.

B. James R. McReynolds And Thomas A. Genise Are Co-Inventors Of the Subject Matter Defined in Proposed Counts 1 and 2 of the Second Request For Interference

As set forth below, James R. McReynolds and Thomas A. Genise are co-inventors of the subject matter defined in proposed Counts 1 and 2 of the Second Request For Interference.

As indicated above, in August 1993, McReynolds contacted Thomas Genise to discuss the possibility of implementing and developing the partially automated transmission system which McReynolds referred to as "AutoStick".

Genise renamed AutoStick as "AutoSplit" and devised implementation options for the AutoSplit system. On November 15, 1993, Genise sketched on an electronic white board three options of how AutoSplit could be implemented during a meeting (Genise Affd. ¶9). Exhibit C is a copy of those three sketches. Options 1, 2 and 3 show a manual transmission, a display unit for displaying the different gear ratios, an engine control unit for controlling the engine and a stick shift having a switch pad (options 1 and 3) or up/down buttons (option 2) for initiating the shift. Genise explained at the meeting that in response to the driver depressing the switch pad or up/down buttons, the engine control unit controls engine fueling so as to reach a zero torque level, thereby allowing the driver to move the shift lever to the neutral position. Genise further explained that after neutral was sensed, the engine control would control engine fueling to approach the synchronization speed for the next gear (Genise Affd. ¶9).

On December 9, 1993, Genise prepared a project proposal for a concept AutoSplit, called "Electronically Enhanced Super 10". Exhibit D is a copy of the December 9, 1993 proposal. Exhibit D includes several options for implementing AutoSplit including different versions of the intent-to-shift switch.

On May 13, 1994, Genise prepared an "AutoSplit Specification for the Concept Prototype". Exhibit E is a copy of the specification which includes a description of the different engine control routines for the system. Specifically, section 5.5.4 of Exhibit E describes the "predip" mode during which the AutoSplit algorithm fuels the engine to provide zero driveline torque, and a "sync" mode which occurs when neutral is sensed and which commands the engine to approach the synchronization speed for the newly selected gear.

C. Comparison of the Proposed Counts With The Contributions of McReynolds and Genise

The proposed Counts 1 and 2 of the Second Request For Interference include the features of providing the operator the ability to request torque elimination to allow the operator to move the transmission to a neutral position when the torque elimination signal is received from the input control, and controlling the engine speed for the next gear so that the operator can shift from the neutral position to the next gear. James R. McReynolds's specification (Exhibit A) describes these features of the proposed counts. The proposed Counts 1 and 2 of the Second Request For Interference include the additional feature of an input control for allowing an operator to provide an indication to the electronic

control unit that a particular shift (e.g., upshift/downshift) is to be initiated. Thomas A. Genise conceived of this additional feature which he presented during the meeting on November 15, 1993. Specifically, Exhibit C shows three options of how AutoSplit could be implemented. Options 1, 2 and 3 show a manual transmission, a display unit for displaying the different gear ratios, and engine control unit for controlling the engine and a stick shift having a switch pad (options 1 and 3) or up/down buttons (option 2) for initiating the shift. As set forth in his Affidavit, during the November 15, 1993 meeting, Genise explained that in response to the driver depressing the switch pad or up/down buttons for indicating either an up or a down shift, the engine control unit controls engine fueling so as to reach a zero torque level to allow the operator to move the shift lever to the neutral position. Genise also explained that after neutral was sensed, the engine control would control engine fueling to approach synchronization speed for the next gear selected by the operator.

In view of Exhibits A, C, D and E and the Affidavits of Genise and McReynolds, the subject matter defined in proposed Counts 1 and 2 of the Second Request For Interference was co-invented by James R. McReynolds and Thomas A. Genise.

IV. THIRD REQUEST FOR INTERFERENCE OF U.S. PATENT NO. 5,569,115

In the Third Request For Interference, Applicant requested that the Examiner declare an interference between U.S. Patent No. 5,569,115 and the subject application.

A. The Proposed Counts

In the Third Request For Interference, Applicant proposed the following Counts 1 and 2 for the interference.

COUNT 1

A method of controlling the operation of a vehicle, comprising the steps of:

a) providing an engine having an output shaft, an electronic control unit for controlling the speed of said engine output shaft, said engine output shaft being connected to drive a multi-speed transmission, and said electronic control unit being operable to calculate the ratio of the transmission and engine output shaft speeds, and determine which gear is currently engaged;

b) operating a vehicle using the system provided in step a);

c) determining a currently engaged gear by calculating the ratio of the engine and transmission output shaft speeds, and comparing said calculated ratio to expected ratios;

d) determining whether an upshift or a downshift is to be expected as the next shift;

e) determining a desired engine synchronization speed at a next expected gear by determining said next expected gear based upon said currently engaged gear and said expected shift of step d), and identifying an engine synchronization speed by multiplying the speed ratio at said next expected gear with the current transmission output speed; and

f) beginning to control said output speed of said engine output shaft to approach said synchronization speed; and

g) shifting said multi-speed transmission toward said next expected gear.

COUNT 2

A vehicle drive system comprising:

a) an engine having an output shaft;

b) an electronic control unit for controlling an output speed of said engine;

c) a multi-speed transmission operably connected to be driven by said engine output shaft;

d) a manual stick shift to allow an operator to change the speed ratios of said transmission; and

e) a driver shift intent switch to allow a driver to send a signal to said electronic control unit of whether an upshift or a downshift is to be next expected, said electronic control unit being operable to determine a currently engaged gear, determine a next expected gear based upon said currently engaged gear and said driver shift intent signal, determine a synchronization speed for shifting to said next expected gear, and change said engine speed to move toward said synchronization speed when a shift is being made.

OR

A vehicle drive system comprising:

a) an engine having an output shaft;

b) an electronic control unit for controlling an output speed of said engine;

c) a multi-speed transmission operably connected to be driven by said engine output shaft;

d) a manual stick shift to allow an operator to change the speed ratios of said transmission; and

e) a driver shift intent switch to allow a driver to send a signal to said electronic control unit that a particular shift is to be expected, said electronic control unit being operable to determine a currently engaged gear, determine a next expected gear based upon said currently engaged gear and based on receiving said driver shift intent signal, determine a synchronization speed for shifting to said next expected gear, and change said engine speed to move toward said synchronization speed when a shift is being made.

Count 1 defines a method of controlling the operation of a vehicle drive, and Count 2 defines a vehicle drive system. The proposed Count 1 corresponds exactly to the Desautels '115 patent claim 8 and to Genise '164 application claim 91. The proposed Count 2 is in the "OR" format and corresponds exactly to Desautels

'115 patent claim 18 and to Genise '164 application claim 100 - or to claim 143 of the present application.

B. James R. McReynolds and Thomas A. Genise Are Co-Inventors of Proposed Counts 1 and 2 of the Third Request For Interference

As set forth below, James R. McReynolds and Thomas A. Genise are co-inventors of the subject matter defined in proposed Counts 1 and 2 of the Third Request For Interference.

The proposed Count 1 of the Third Request For Interference defines a method of controlling a vehicle which includes the features of determining the currently engaged gear, determining whether an upshift or a downshift is to be expected as the next shift, determining the engine synchronization speed at the next expected gear, and controlling the engine to achieve the engine synchronization speed at the next expected gear so that the transmission can be shifted to the next gear. The proposed Count 2 is similar to Count 1, but includes a driver shift intent switch for allowing the driver to send a signal to the electronic control unit that a particular shift (e.g., upshift or downshift) is to be expected.

As discussed above, McReynolds' specification (Exhibit A) describes a method of controlling the operation of a multi-speed (ten speed) transmission which includes determining the currently engaged gear. In Exhibit A the system determines when a gear lever gets into a particular gear. Exhibit A also describes calculating a RPM for a new gear, and controlling the engine to achieve the RPM at the new gear so that the transmission can be shifted to the new

gear. In the system of Exhibit A, the driver initiates a shift based on engine sound, feel and the reading of the speedometer.

As also indicated above, after discussions with McReynolds, Thomas A. Genise conducted a meeting on November 15, 1993. At that meeting Genise sketched three options of how AutoSplit could be implemented (Exhibit C). During the meeting, Genise explained that in response to the driver depressing a switch pad or up/down buttons, the engine control unit controls engine fueling so as to reach a zero torque level, thereby allowing the driver to move the shift lever to the neutral position without using the clutch. Genise further explained that after neutral was sensed, the engine control would control engine fueling to approach the synchronization speed for the next gear indicated by the operator. On December 9, 1993, Genise prepared a project proposal for a concept AutoSplit (Exhibit D). Exhibit D includes several options for implementing AutoSplit including different versions of the intent-to-shift switch. Exhibit D describes determining the "desired gear" (i.e., desired upshift or downshift), and displaying this desired gear to the operator. Exhibit D also describes an up/down switch for indicating whether an upshift or a downshift is to be initiated. For example, Fig. 2 of Exhibit D shows a Driver Control Console including an up push-button 120 and a down push-button 124. As shown in Fig. 2 of Exhibit D, a control signal is provided from the Driver Control Console to the ECU 106. The AutoSplit Specification dated May 13, 1994 and prepared by Thomas A. Genise (Exhibit E) describes in section 5.5.4 the Engine Control

modes in greater detail. According to Exhibit E, the sync mode is entered when neutral is sensed in the transmission. The system commands the engine speed and provides a reference speed which is based on the product of the current transmission output shaft speed and the newly selected gear ratio.

In view of Exhibits A, C, D and E, James R. McReynolds and Thomas A. Genise are co-inventors of the subject matter defined in proposed Counts 1 and 2 of the Third Request For Interference.

V. FOURTH REQUEST FOR INTERFERENCE OF U.S. PATENT NO. 5,573,558

In the Fourth Request For Interference, Applicant requested that the Examiner declare an interference between U.S. Patent No. 5,573,558 and the subject application.

A. The Proposed Counts

In the Fourth Request For interference, Applicant proposed the following Counts 1 and 2 for the interference.

COUNT 1

> A method of controlling the operation of a vehicle comprising the steps of:
>
> (a) providing an engine having an output shaft, an electronic control unit for controlling the speed of said engine output shaft, said engine output shaft being connected to drive a multi-speed transmission through a clutch, and said electronic control unit being provided with information regarding a currently engaged gear in said transmission, and further to calculate the speed ratio at a next expected gear and determine a synchronization speed for the engine based upon the speed ratio at said next expected gear and the transmission output speed;
>
> (b) operating a vehicle using the system provided in step (a);

(c) determining the currently engaged gear and whether an upshift or a downshift is to be expected as the next shift based upon system operating conditions;

(d) determining a next expected gear based upon said currently engaged gear and said expected shift of step (c);

(e) receiving a signal that said transmission has been moved to neutral and identifying an engine synchronization speed by multiplying the speed ratio at said next expected gear with the current transmission output speed and beginning to control said output speed of said engine output shaft to approach said synchronization speed;

(f) varying said engine output speed above and below said synchronization speed such that said engine output speed periodically crosses an actual required synchronization speed for said transmission; and

(g) manually shifting said multi-speed transmission towards said next expected gear.

COUNT 2

A method of controlling the operation of a vehicle comprising the steps of:

(a) providing an engine having an output shaft, an electronic control unit for controlling the speed of said engine output shaft, said engine output shaft being connected to drive a multi-speed transmission through a clutch, and said electronic control unit being provided with information regarding a currently engaged gear in said transmission, and further to calculate the speed ratio at a next expected gear and determine a synchronization speed for the engine based upon the speed ratio at said next expected gear and the transmission output speed;

(b) operating a vehicle using the system provided in step (a);

(c) determining the currently engaged gear and whether an upshift or a downshift is to be expected as the next shift based upon system operating conditions;

(d) determining a next expected gear based upon said currently engaged gear and said expected shi[f]t of step (c);

(e) receiving a signal that said transmission has been moved to neutral and identifying an engine synchronization speed by multiplying the speed ratio at said next expected gear with the current transmission output speed and beginning to control said output speed of said engine output shaft to approach said synchronization speed;

(f) adding an offset to said synchronization speed, and begin varying said engine output speed to approach said synchronization speed, with said offset; and

(g) manually shifting said multi-speed transmission towards said next expected gear.

Counts 1 and 2 define a method of controlling the operation of a vehicle drive. The proposed Count 1 corresponds exactly to the Palmeri '558 patent claim 5 and to Genise '164 application claim 132. The proposed Count 2 corresponds exactly to Palmeri '558 patent claim 28 and to Genise '164 application claim 139.

B. Thomas A. Genise and Ronald K. Markyvech Are the Inventors of Proposed Counts 1 and 2 of the First Request For Interference

Exhibit 12 is a printout of the actual software code contained in the transmission ECU during the August 29-31, 1994 test trip. The front page of Exhibit 12 identifies the dates of the various files contained in the software program, with the latest date being August 29, 1994. With the assistance of Tom Genise, Ron Markyvech wrote the software program of Exhibit 12 which is written in "C" computer language. (Genise Affd. ¶15, Markyvech Affd. ¶12).

The transmission ECU software (Exhibit 12) included routines for determining the currently engaged gear and the next expected gear. (Genise Affd. ¶16, Markyvech Affd. ¶13). Specifically, based on information from the input and output shaft speed sensors, the function determine_gear from module trans_act.C96 determined the

currently engaged gear. (Genise Affd. ¶16, Markyvech Affd. ¶13). The function get_automatic_gear from module sel_gear.c96 determined whether an upshift or a downshift is to be expected as the next shift and calculated the speed ratio at the next expected gear. (Genise Affd. ¶16, Markyvech Affd. ¶13). The function get_automatic_gear determined whether an upshift or downshift is to be expected based on such operating conditions as upshift/downshift points, transmission input speed, output shaft speed and acceleration pedal position. (Genise Affd. ¶16, Markyvech Affd. ¶13).

The transmission ECU further included a software routine for determining a synchronization speed for the engine based on the next expected gear ratio and the transmission output speed. (Genise Affd. ¶16, Markyvech Affd. ¶13). Specifically, within module drl.cmds.c96, the function control_engine_sync was used to control the engine synchronization speed. (Genise Affd. ¶16, Markyvech Affd. ¶13). Further, in order to determine the sync speed for the next gear, the function desired_engine_speed was set equal to (int)(gos_signed + sync-offset), where gos = (next gear x transmission output shaft speed). (Genise Affd. ¶16, Markyvech Affd. ¶13). In order to ensure that the synchronization speed was obtained, the software controlled the engine speed to vary or toggle above and below the true sync. speed. (Genise Affd. ¶16, Markyvech Affd. ¶13). This ensured that the engine speed would periodically cross the actual sync. speed. (Genise Affd. ¶16, Markyvech Affd. ¶13). Specifically, in the module drl_cmds.c96, the

function control_engine_sync and the if statement "toggle" varied the engine speed above and below the true sync. speed every two seconds. (Genise Affd. ¶16, Markyvech Affd. ¶13). Once the synchronization speed was obtained, the operator could manually shift the transmission towards the next expected gear. (Genise Affd. ¶16, Markyvech Affd. ¶13).

Thomas A. Genise subsequently prepared a Technical Report entitled "AutoSplit Truck Transmission Concept Prototype" dated February 21, 1995 (Exhibit 21). Pages 58-61 of the Fourth Request For Interference set forth in table form a comparison of the proposed Counts 1 and 2 to Exhibit 21. The table shows that each of the features defined in the proposed counts are set forth in Exhibit 21.

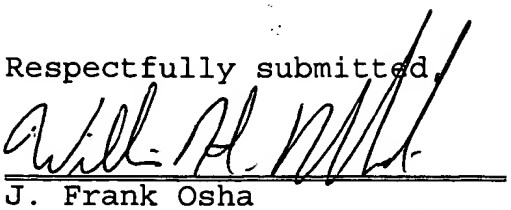
In view of Exhibits 12 and 21 and the Affidavits of Thomas A. Genise and Ronald K. Markyvech, Genise and Markyvech are co-inventors of the subject matter defined in proposed Counts 1 and 2 of the Fourth Request For Interference.

VI. CONCLUSION

As identified above, James R. McReynolds is the inventor of the subject matter of proposed Counts 1 and 2 of the First Request For Interference. McReynolds and Thomas A. Genise are the co-inventors of the proposed Counts 1 and 2 of the Second Request For Interference. McReynolds and Genise are also the co-inventors of the subject matter of proposed Counts 1 and 2 of the Third Request For Interference. Finally, Genise and Ronald K. Markyvech are co-

inventors of the subject matter of proposed Counts 1 and 2 of the Fourth Request For Interference.

Respectfully submitted,



J. Frank Osha
Registration No. 24,625
William H. Mandir
Registration No. 32,156

SUGHRUE, MION, ZINN,
MACPEAK & SEAS, PLLC
2100 Pennsylvania Avenue, N.W.
Washington, D.C. 20037
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

THOMAS A. GENISE

Application No: 08/666,164 Group Art Unit: 3502

Filed: June 19, 1996 Examiner: T. Kwon

For: AUTOMATED TRANSMISSION SYSTEM CONTROL WITH ZERO ENGINE FLYWHEEL TORQUE DETERMINATION

EXHIBITS A-E AND 1-30
REQUEST FOR INTERFERENCES
PURSUANT TO 37 C.F.R. §§1.607 AND 1.608